

Listing of Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

forming a chemical oxide film on a surface of the semiconductor film comprising silicon by using a liquid chemical;

doping the semiconductor film comprising silicon with impurity ions through the chemical oxide film; and

forming at least one channel region comprising a portion of the doped semiconductor film.

2. (Previously Presented) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

terminating dangling bonds on a surface of the semiconductor film comprising silicon with oxygen to prevent the semiconductor film from being etched by a subsequent doping step;

doping the semiconductor film comprising silicon with impurity ions after terminating dangling bonds on a surface of the semiconductor film; and

forming at least one channel region comprising a portion of the doped semiconductor film.

3. (Previously Presented) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

terminating dangling bonds on a surface of the semiconductor film comprising silicon with an element to be bonded with bonding energy higher than that of Si-H bonds to prevent the semiconductor film from being etched by a subsequent doping step;

doping the semiconductor film comprising silicon with impurity ions after terminating dangling bonds on a surface of the semiconductor film; and

forming at least one channel region comprising a portion of the doped semiconductor film.

4. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein the semiconductor film comprising silicon is an amorphous semiconductor film comprising silicon.

5. (Original) A method of manufacturing a semiconductor device according to claim 2, wherein the semiconductor film comprising silicon is an amorphous semiconductor film comprising silicon.

6. (Original) A method of manufacturing a semiconductor device according to claim 3, wherein the semiconductor film comprising silicon is an amorphous semiconductor film comprising silicon.

7. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, and a heat treatment is conducted to form a polycrystalline semiconductor film comprising silicon.

8. (Original) A method of manufacturing a semiconductor device according to claim 2, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, and a heat treatment is conducted to form a polycrystalline semiconductor film comprising silicon.

9. (Original) A method of manufacturing a semiconductor device according to claim 3, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, and a heat treatment is conducted to form a polycrystalline semiconductor film comprising silicon.

10. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, a catalytic element having an effect of accelerating crystallization is applied to the silicon-containing amorphous semiconductor film, and a heat treatment is conducted to form a silicon-containing crystalline semiconductor film.

11. (Original) A method of manufacturing a semiconductor device according to claim 2, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, a catalytic element having an effect of accelerating crystallization is applied to the amorphous semiconductor film comprising silicon, and a heat treatment is conducted to form a crystalline semiconductor film comprising silicon.

12. (Original) A method of manufacturing a semiconductor device according to claim 3, wherein an amorphous semiconductor film comprising silicon is deposited as the semiconductor film comprising silicon, a catalytic element having an effect of accelerating crystallization is applied to the amorphous semiconductor film comprising

silicon, and a heat treatment is conducted to form a crystalline semiconductor film comprising silicon.

13. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein a material including hydrogen is used as an ion source for the impurity ions used in the doping step.

14. (Original) A method of manufacturing a semiconductor device according to claim 2, wherein a material including hydrogen is used as an ion source for the impurity ions used in the doping step.

15. (Original) A method of manufacturing a semiconductor device according to claim 3, wherein a material including hydrogen is used as an ion source for the impurity ions used in the doping step.

16. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein the doping step allows channel doping to be implemented.

17. (Original) A method of manufacturing a semiconductor device according to claim 2, wherein the doping step allows channel doping to be implemented.

18. (Original) A method of manufacturing a semiconductor device according to claim 3, wherein the doping step allows channel doping to be implemented.

19. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein the chemical oxide film is formed by a treatment with ozone water.

20. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein the chemical oxide film is formed by a treatment with hydrogen peroxide solution.

21. (Original) A method of manufacturing a semiconductor device according to claim 1, wherein the chemical oxide film is formed by an ozone treatment through ultraviolet irradiation in an atmosphere containing oxygen.

22. (Original) A method of manufacturing a semiconductor device according to claim 10, wherein at least one element selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au is added as the catalytic element.

23. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

forming a chemical oxide film on a surface of the semiconductor film comprising silicon by using a liquid chemical;

doping the semiconductor film comprising silicon with impurity ions through the chemical oxide film;

patterning the semiconductor film to form at least one active layer after doping;

forming a gate insulating film over the active layer after patterning the semiconductor film; and

forming a gate electrode over the semiconductor film with the gate insulating film interposed therebetween,

wherein the chemical oxide film is formed by a treatment with at least one material selected from the group of: ozone water and a hydrogen peroxide solution.

24. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

25. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

26. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

27. (Previously Presented) A method of manufacturing a semiconductor device according to claim 23, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

28. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

forming a chemical oxide film on a surface of the semiconductor film comprising silicon by using a liquid chemical;

doping the semiconductor film comprising silicon with impurity ions through the chemical oxide film;

forming a gate insulating film over the semiconductor film after doping; and

forming a gate electrode over the gate insulating film.

29. (Previously Presented) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

terminating dangling bonds on a surface of the semiconductor film comprising silicon with oxygen to prevent the semiconductor film from being etched by a subsequent doping step;

doping the semiconductor film comprising silicon with impurity ions after terminating dangling bonds;

forming a gate insulating film over the semiconductor film after doping; and

forming a gate electrode over the gate insulating film.

30. (Previously Presented) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over an insulating substrate;

terminating dangling bonds on a surface of the semiconductor film comprising silicon with an element to be bonded with bonding energy higher than that of Si-H bonds to prevent the semiconductor film from being etched by a subsequent doping step;

doping the semiconductor film comprising silicon with impurity ions after terminating dangling bonds;

forming a gate insulating film over the semiconductor film after doping; and

forming a gate electrode over the gate insulating film.

31. (Previously Presented) A method of manufacturing a semiconductor device according to claim 28, wherein, in the doping step, a material gas is at least one selected from the group consisting of diborane, phosphine, arsine and those obtained through dilution thereof with hydrogen.

32. (Previously Presented) A method of manufacturing a semiconductor device according to claim 29, wherein, in the doping step, a material gas is at least one selected from the group consisting of diborane, phosphine, arsine and those obtained through dilution thereof with hydrogen.

33. (Previously Presented) A method of manufacturing a semiconductor device according to claim 30, wherein, in the doping step, a material gas is at least one selected from the group consisting of diborane, phosphine, arsine and those obtained through dilution thereof with hydrogen.

34. (Previously Presented) A method of manufacturing a semiconductor device according to claim 28, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

35. (Previously Presented) A method of manufacturing a semiconductor device according to claim 29, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

36. (Previously Presented) A method of manufacturing a semiconductor device according to claim 30, wherein the semiconductor device is at least one device selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a front type projector and a rear type projector.

37. (New) A method of manufacturing a semiconductor device according to claim 1, wherein the chemical oxide film is 5nm thick or less.

38. (New) A method of manufacturing a semiconductor device according to claim 23, wherein the chemical oxide film is 5nm thick or less.

39. (New) A method of manufacturing a semiconductor device according to claim 28, wherein the chemical oxide film is 5nm thick or less.